

NAVY MEDICINE

July-August 1999



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COVER: Commandant of the Marine Corps, GEN Charles C. Krulak, presents the Navy Cross posthumously to the brothers of HM3 Joseph Keenan who died a hero's death in Korea 46 years ago. Story on page 8. U.S. Marine Corps photo.

Physician Assistant Anniversary

With the approach of the new millennium and all the exciting challenges that it will bring for the Medical Service Corps, we physician assistants (PAs) have cause to reflect and celebrate. On 31 July 1999 we will pause to note 25 years service of PAs to the Navy. Our initial transition began on that date in 1974, with six hospital corpsmen completing their 2 years of training and being promoted to warrant officer (W-1). The following day, additional hospital corpsmen completed their training and were also promoted to warrant officer.

An interesting historical footnote from that period points out that the PAs who were promoted on 1 Aug had started their training first and actually had 3 years of training. Since then, the Navy has developed and conducted its own education and training program for PAs, as well as accepted direct procurement and civilian scholarship PAs. PAs are serving in hospitals and clinics in the United States and overseas. They are touching the future as educators, and one can even be found providing support to the First Family. PAs are serving on ships and have augmented medical units with the Marines. In 1979 PAs were assigned to aircraft carriers on an experimental basis. Within a year those billets became permanent.

PAs have evolved in their professional diversity and served as department heads on AEs and AOs. The PA program was originally developed due to a shortage of primary care physicians brought about by the end of the Berry Plan. The community quickly developed into an entirely new level of health care professional.

As the needs of the service changed the PA training program experienced periods of suspension and resumption between 1974 and 1986 but overall the profession thrived. In 1989 Navy PAs were invited to become part of the Medical Service Corps and over 100 took this opportunity. Subsequently we saw the last active duty warrant officer PA retired in 1997. On 1 Sept 1998 the first PAs were promoted to commander in the Medical Service Corps.

There are currently well over 200 PAs on active duty and a significant number in the reserves. Their promise is the same today as it was in 1974: high quality, cost-effective primary health care provided in a caring manner.

—Story by CDR Charles H. Brakhage, MSC, Physical Qualifications and Review Division (MED-25), Bureau of Medicine and Surgery, Washington, DC.

Flag Officer Selections

RADM-selectee **Donald C. Arthur, MC**, is currently Assistant Chief for Health Care Operations (MED-03), Bureau of Medicine and Surgery, Washington, DC. He holds an M.D. degree, a Ph.D. in health care management, and a law degree (J.D.).

He entered naval service in 1974 and after a surgical internship, he consecutively completed both Navy operational curricula in flight surgery and undersea medicine. His additional operational qualifications include Surface Warfare Medical Department

Officer, Saturation Diving Medical Officer, Hyperbaric (Recompression) Facility Operator, Radiation Health Officer, Navy-Marine Corps Parachutist and Jumpmaster, and he is qualified in submarines.

Dr. Arthur's naval service includes research in mixed gas saturation diving and cold weather medicine. He served 2 years in the Philippines as both a flight surgeon and diving medical officer followed by duty as senior medical officer aboard USS *Kitty Hawk* (CV-63). He completed a residency in emergency medicine followed by a tour as a staff emergency medicine specialist and Director of the Emergency Medicine Division at Naval Hospital San Diego, CA.

While at the Naval Aerospace Medical Institute, Pensacola, FL, he was head of the Special Products Division and deployed with 2nd Medical Battalion in a forward combat unit during Desert Shield/Storm. He then served as Director of Medical Programs for the Marine Corps at Marine Corps Headquarters, Washington, DC, and as Deputy Commander of Naval Medical Center San Diego before commanding Naval Hospital Camp Lejeune, NC.

Dr. Arthur is board certified in preventive medicine (aerospace) and is a certified healthcare executive in the American College of Healthcare Executives. CAPT Arthur holds two Legions of Merit, three Meritorious Service Medals, three Navy Commendation Medals, and a Navy Achievement Medal in addition to numerous unit, service, and campaign awards.

RADM-selectee **Richard A. Mayo, MC**, is currently Fleet Surgeon/Director for Fleet Medical Operations, Com-



CAPT Donald C. Arthur, MC



CAPT Richard A. Mayo, MC

mander in Chief, U.S. Pacific Fleet. He was born in Nashua, NH, and received a B.A. degree in biology from Northeastern University, Boston, MA, in 1966. In 1970 he received his M.D. degree from Boston University School of Medicine. Dr. Mayo completed his internship in 1971 and residency in general surgery in 1975 at Albany Medical Center Hospital, Albany, NY.

CAPT Mayo reported for active duty in 1975. His military assignments have included Assistant Medical Officer and General Surgeon, USS *Roosevelt* (CVA-42), 1975-1976; Staff Surgeon, Naval Regional Medical Center, Jacksonville, FL, 1976-1982; Staff Surgeon, Head, Surgery Department, Director, General Surgery Training Program, and Director for Surgical Services, Naval Hospital Portsmouth, VA, 1982-1990; and Executive Officer, Naval Hospital Charleston, SC, 1990-1992.

While at Charleston from August 1990 to March 1991, he deployed to Saudi Arabia as Commanding Officer, Fleet Hospital Five. This was the first deployment of a Navy fleet hospital in a real contingency situation, and the hospital was awarded a Navy Unit Commendation.

CAPT Mayo was Commanding Officer, Naval Hospital Bremerton, WA, from 1992 to 1994. He was the Deputy Assistant Chief for Health Care Operations at the Bureau of Medicine and Surgery, Washington, DC, from 1994 to 1996 and the Assistant Chief for Health Care Operations from July to October 1996. From 1997 until 1998, he was the Lead Agent of TRICARE Pacific. This includes Alaska, Hawaii, the Western Pacific, and remote sites. He has held his current assignment since December 1996.

During his tour at Naval Hospital Portsmouth, he served on the team that evaluated the medical care available in Bahrain and aboard Navy vessels in the Persian Gulf. He also was the Joint Task Force Surgeon who helped plan the military health care support for President Bush during the Cartagena Summit in February 1990.

Dr. Mayo's military awards include the Legion of Merit (with two gold stars), Meritorious Service Medal (with gold star), Navy Commendation Medal, Joint Service Achievement Medal, as well as numerous other campaign and service medals.

CAPT Mayo is board certified by the American Board of Surgery and National Board of Medical Examiners. He is a member of the American College of Physician Executives.

RADM-selectee **Joseph P. VanLandingham**, MSC, is currently Commanding Officer, Naval Health Care New England. He was born in Charleston, SC, and was commissioned an ensign in the Medical Service Corps



CAPT Joseph P. VanLandingham, MSC

on 10 July 1973 while a student at Georgia State University. His first assignment was at National Naval Medical Center, Bethesda, MD. In 1976 he became aide to the Surgeon General, Bureau of Medicine and Surgery, Washington, DC, and in 1979 was appointed the first officer in charge for the regional Personnel Support Detachment, Bethesda, MD.

CAPT VanLandingham received his B.S. degree in general management from Georgia Institute of Technology in 1972 and his bachelor of business administration in health care management from Georgia State University in 1973. He earned his M.B.A. in organizational behavior and development at The George Washington University in 1984.

Subsequent assignments included Assistant Director for Administration, Naval Hospital Charleston, SC; Director for Administration, U.S. Naval Hospital Guam; Medical Corps Assignment Officer, Bureau of Naval Personnel; Director for Administration, Naval Hospital Orlando, FL; Executive Officer, Naval Hospital, Camp Lejeune, NC; and Commanding Officer, Naval Hospital Newport, RI. With the establishment of Naval Health Care New England in March 1998, CAPT VanLandingham became the organization's first commanding officer.

CAPT VanLandingham is a fellow of the American College of Healthcare Executives. He serves on the ACHE Examination Subcommittee and Regent's Advisory Council for Rhode Island. His personal awards include the Legion of Merit, Meritorious Service Medal, Navy and Marine Corps Commendation Medal (with gold star), and Navy and Marine Corps Achievement Medal (with gold star). □

Experimental Biochemical Decompression Method for Navy Divers

Dr. Kayar watches the beginning of a simulated dive to 759 feet of sea water (230 meters) that will last 3 hours. This 200 cu.ft. chamber was specially designed for operating on a variety of gas mixtures including hydrogen, helium, and air.



Navy biomedical researchers are looking for new ways of reducing the risk of decompression sickness for over 4,000 divers working in the Navy's Explosive Ordnance Disposal, Naval Special Warfare, and Diving communities. After a dive, Navy divers return to the surface slowly to allow time for losing excess gas absorbed in their bodies from the breathing mixtures used during the dive. A rapid ascent might cause the excess gas to form bubbles that could lead to serious health consequences. This decompression phase, structured to mini-

mize the divers' risk of decompression sickness, can be time-consuming and dangerous.

A team of scientists and technicians at the Naval Medical Research Center (NMRC), Bethesda, MD, with funding from the Office of Naval Research, is making progress on a novel method of biochemical decompression. Dr. Susan Kayar, head of the NMRC Decompression Research Program, and her team have developed a

research animal model for ultra-deep diving using hydrogen as the primary component of the breathing gas mixture. In this model, nontoxic bacteria (*Methanobrevibacter smithii*), native to the intestinal tract, are used to remove some of the hydrogen dissolved in the animal during a simulated dive in a dry chamber.

According to Dr. Kayar, "Removing even a

small portion of the total body burden of gas significantly reduces the risk of decompression sickness as the divers return from their dive. Right now, the approach we are using simulates ultra-deep dives to 2,000 feet. We add bacteria into the intestines of our animal models to metabolize the hydrogen to water and methane. We measure how much methane the animal releases and this gives us an index of how well the bacteria are working in

the intestine. From this we can predict how much the risk of decompression sickness is lowered."

While investigating the use of this method for divers, a spin-off product for general consumer use was discovered. Dr. Kayar pointed out, "This technique of using hydrogen metabolizing bacteria has an application for people who don't dive at all. A great many people experience overgrowth of bacteria that make hydrogen in their intestines. If for some reason that hydrogen isn't lost from the intestines along with the other intestinal gases, it can cause a great deal of pain, bloating, and discomfort. It is possible that the bacteria we are working with here could significantly reduce their discomfort. So, a product that was originally designed for Navy divers may provide relief to a great many people."

With 3 years of basic research on this project behind her, the next step is to work through the FDA approval process and develop an enteric-coated capsule for divers to use. Dr. Kayar explained, "We would like to find a pharmaceutical company that would freeze-dry the bacteria and encapsulate them for use in human trials to test the tolerance levels. This is the first step in transitioning the research results from animal testing to human testing."

The current studies focus on hydrogen for deep diving, but future plans are to extend the approach to shallow water air diving, using bacteria that metabolize nitrogen. Dr. Kayar said,

"What we would like to do is to make a transition from hydrogen metabolizing bacteria to nitrogen metabolizing bacteria, but the problem is that nitrogen metabolism is much slower. What we need is a more active form of bacteria to be developed and this will probably require some genetic engineering. We would be interested in working with a commercial or academic partner who would develop the bacteria we need for this research."

Dr. Kayar's team is interested in investigating other areas of decompression sickness as well. Dr. Kayar pointed out two areas she would like to work on, questions yet to be answered, "Is the risk of decompression sickness higher or lower when a diver is cold or warm during the dive, or cold or warm during the period immediately after

decompression? Is an inflammatory response to the bubbles a cause of decompression sickness and not how many bubbles or the location of the bubbles a cause? Can decompression sickness be avoided by blocking an immune reaction by the body?"

Dr. Kayar is assisted in her research in biochemical decompression by Dr. William Whitman and Winston Lin, microbiologists at the University of Georgia, and by Dr. Terry Miller and Dr. Mike Wolin, bacteriologists at the New York State Department of Health. Her Bethesda team is composed of her graduate research assistant Andreas Fahlman, and chamber operators and technical support personnel Richard Ayres, Jerry Morris, Roland Ramsey, Chief Robert Hale and Chief Anthony Ruopoli. □

—Story by Doris Ryan, Medical Research and Development Division (MED-26), Bureau of Medicine and Surgery, Washington, DC.



Roland Ramsey, chamber support technician (left) and Dr. Kayar watch as a simulated 3-hour dive begins in the laboratory. Equipment to operate the chamber and facilities include high ventilation fans for the chamber room, infrared cameras, hydrogen sensors for detecting hydrogen leaks, and a computerized system for automated running of the diving chamber. Since mixtures of hydrogen and oxygen are explosive over a wide range of their relative concentrations, this system is designed to reduce the risks of operator error in gas mixing in the chamber.

Nurses at Sea:

Providing Medical Care 8 Months Out of the Year



HM1(FMF) J.K. Sandridge

LCDR Ursem checks out a patient in sick bay.

There are many faces to the Military Sealift Command (MSC) and as an integral part of U.S. Maritime Strategy, USNS ships have been at the forefront of operations supporting the active fleet around the globe. While serving Amphibious Forces afloat USNS ships were the ones that brought us not only resupply but also valuable mail and that much-needed package or cargo request.

Many members of the MSC community are prior Navy and a few are active within the Navy Reserves. Among those serving their drill requirements at Naval Hospital Great Lakes, IL, is LCDR Andrea Ursem, NC, USNR-R. LCDR Ursem is a trauma nurse who serves in our emergency room providing care to Navy recruits on their way to become sailors in the United States Navy.

When LCDR Ursem is not drilling she is afloat 8 to 9 months of the year. She is the ship's "doc" and joined the Merchant Marine last year. Her first assignment was aboard USNS *Bowditch* (T-AGS 62), an Oceanographic Survey Ship. "I only saw these ships in *National Geographic* and the Wonderful Underwater World of Jacques Cousteau. I never imagined answering an ad for Dyn Marine Services would lead to such an assignment," LCDR Ursem said. Her view of the USNS ships was the oilers and supply ships that passed by the naval shipyard at Portsmouth, VA, when she was serving on active

duty as a nurse at Naval Medical Center Portsmouth.

Bowditch conducted acoustical research, marine hydrographic surveys, magnetic surveys, and geophysics research in the Persian Gulf. "I was looking forward to doing some shopping in the bazaars of Dubai and Bahrain but we were restricted to the ship due to security concerns created by Osama Bin Laden. From the Gulf we left for Singapore, the transit was my first introduction to collateral duties aboard the ship. Having been infatuated with sailing and the sea I looked forward to taking over many assignments outside my medical duties."

An Oceanographic Ship has a crew of only 27 and crewmembers share many duties. Ursem explained how she stood in port deck watch and handled lines and that after 4 1/2 months aboard she became an old salt. "One of my more interesting duties was standing watch for pirates as we transited the Straits of Malacca," commented Ursem. On their way to Singapore *Bowditch* pulled into Hong Kong in August and sampled a fascinating array of foods, goods, and the majesty of the former British colony famous for its commercialism.

"The *Bowditch* finally made her way back to the States and in less than a month of being home I was called on to replace a nurse aboard USNS *Pathfinder* (T-AGS 60) which was in port in Naples, Italy. Packing a seabag I flew to Italy and caught the ship," remarked Ursem.

The *Pathfinder*, the same class of ship as *Bowditch*, conducted oceanographic research in the Mediterranean Sea. "Like my previous assignment I was involved in surveying the overall cleanliness of the ship, and maintaining first aid boxes, eye wash centers, water testing for consumption, food preparation survey, and conducting routine sick call on board."

LCDR Ursem's role on the ship is to stabilize a sailor or patient in medical distress until they can be medically evacuated to a facility ashore or afloat. Because the T-AGS class of ships do not have helicopter pads, a helo must hover over the ship and pick up the patient via line. LCDR Ursem keeps equipment handy in the event such an evolution is required.

While performing her reserve drill time at Naval Hospital Great Lakes, the command has recognized LCDR Ursem's unique job with the Military Sealift Command and has offered her shipboard firefighting training at Recruit Training Center (RTC) Great Lakes. She joined other corpsmen and Navy medical personnel aboard the simulator USS *Chief* at RTC Great Lakes. She is also completing a U.S. Army nuclear, biological, and chemical course offered via Naval Hospital Great Lakes. Ursem hopes to take advantage of any training that can enhance her opportunities with Navy medicine and her new career with the Merchant Marine. □

—Story by LT Youssef H. Aboul-Enein, MSC, USNR, Plans, Operations and Medical Intelligence Officer, Naval Hospital Great Lakes, IL.

Commandant Awards Navy Cross for Heroism in a Forgotten War

HMCS(FMF) Mark T. Hacala, USNR

Four platoons of Marines formed on the parade square at Marine Barracks, Washington, DC. The Commandant of the Marine Corps, GEN Charles C. Krulak, faced a line of five brothers standing at solemn attention. The men listened with sadness and pride as their late brother's citation was read: "For extraordinary heroism in action against the enemy while assigned as a hospital corpsman for Company F, Second Battalion, Fifth Marines, First Marine Division serving in the Republic of Korea on 26 and 27 March 1953."

On a terrible night in an unremembered battle of a forgotten war, one hospital corpsman epitomized the Navy's ideals of honor, courage, and commitment. He did so at the cost of his life.

On 14 May 1999, 46 years after his death, HM3 Joseph F. Keenan was posthumously awarded the Navy Cross, the nation's second highest decoration for combat valor, for his gallantry in battle.

Michael Keenan, holding his late brother's Navy Cross, stands beside GEN Charles C. Krulak, Commandant of the Marine Corps.

A Bad Night for Hospital Corpsmen

In the Spring of 1953, long after the dynamic struggles at Inchon and the Chosin Reservoir, a vicious kind of combat had developed in Korea.

Small unit raids from dug-in lines of trenches and bunkers had replaced grand scale campaigns of movement. In this bitter style, the Korean conflict was now reminiscent of the First World War.



U.S. Marine Corps

Forward of the American line ran a string of hilltop outposts opposed by a similar line of Chinese strongholds. North of Seoul, the 5th Marines defended three outposts—known as Carson, Reno, and Vegas—with 40 Marines and a Navy hospital corpsman each. A mere 7 miles away, stalled truce talks tried in vain to end the bloodshed, but a cease fire would not come for another 4 months.

At 1900 on 26 Mar 1953, the Chinese launched a massive attack on the “Nevada Cities” outposts. The communists opened with immense artillery and mortar fire, which would riddle the Marines’ sector with 14,000 rounds in the next 8 hours. In the opening salvos, though, a staggering one to three rounds per second battered the scant garrisons.

As the bombardment began to tell, 3,500 Chinese soldiers attacked the 123 outpost defenders. Marine casualties were heavy and, in less than an hour, the Chinese dug out the handful

of Reno’s survivors from their bunker, which had been blown shut in the barrage, and took five Marines and a hospital corpsman prisoner.

Reno had been quickly overrun. Company C, 1st Battalion, 5th Marines rushed forward to help their beleaguered comrades, and Company F, 2nd Battalion, 5th Marines quickly followed. As they fought their way to the base of Reno hill, the flurry of shrapnel began to find “Fox” Company’s Marines.

HM3 Joe Keenan now sought casualties in need of his care. Barely 20 years old, Keenan had arrived in Korea in February only weeks before—ominously, on Friday the 13th. Now, minutes into his first, hellish battle, shrapnel from a nearby blast struck his hand. A fellow hospital corpsman moved to his aid, but Keenan waved him off, directing him to nearby wounded Marines. That Sailor was killed by shell fragments an instant later.

HM3 Keenan continued his work until another piece of shrapnel found him, this time in the head. Fearing his wounds would be fatal, Keenan reluctantly fell back to his battalion aid station to receive cursory medical care. Although in no shape to go back into the fight because of his serious wounds, HM3 Keenan restocked his medical supplies and crossed the dangerous 1,600 yards to his company’s position.

Back Into the Jaws of Death

The route back to Combat Outpost Reno provided no good news for the hospital corpsman. Steep hills flanked his path, and rice paddies and mine fields covered the adjacent flat ground. That left only the trail to the outpost, which the Chinese had pinpointed for their guns and mortars.

Once back with his Marines, HM3 Keenan continued to move in the open, all the while exposed to incessant shellfire. As he found and treated casualties, a nearby explosion blew



THE UNITED STATES OF AMERICA

THIS IS TO CERTIFY THAT
THE PRESIDENT OF THE UNITED STATES OF AMERICA
HAS AWARDED THE

NAVY CROSS

TO
HOSPITAL CORPSMAN THIRD CLASS JOSEPH F. KEENAN, UNITED STATES NAVY

FOR
EXTRAORDINARY HEROISM
WHILE ENGAGED IN MILITARY OPERATIONS
ON 26 AND 27 MARCH 1953

GIVEN UNDER MY HAND IN THE CITY OF WASHINGTON
THIS 25th DAY OF JUNE 19 98



John A. Deaton
SECRETARY OF THE NAVY

5010-108-01 (Rev. 10-67)

5010-108-01 (Rev. 10-67)



HM3 Joseph F. Keenan

dirt into his eyes, partially blinding him. Although slowed, he was undeterred.

Keenan found his way to Reno Block, a small hilltop 150 yards behind the Reno outpost. There he found two hospital corpsmen from Charlie Company, 1/5 tending to the fallen. HN Francis Hammond pulled the wounded to safety and directed operations at this impromptu aid station. HN Paul Polley had been wounded by shrapnel and was blinded by the blast. Despite this, Polley had his hands guided to his Marines' wounds and treated them by touch alone. As HM3 Keenan performed his medical work similarly impaired, a nearby Marine remarked, "This is a bad night for corpsmen; they're all blind!"

Once these casualties there were stabilized, HM3 Keenan moved off the hilltop into a gully to aid those who were hit trying to retake Reno. The young petty officer soon had six to eight wounded under his care. There, two Marines from Keenan's platoon, PFC Floyd Caton and PVT Dan Holl, came across their friend while trying to find an alternate evacuation route back to the main line.

Both implored Keenan to fall back to a safer area. Caton and Holl argued feverishly, pointing out Keenan's wounds, his inexperience in combat, and the surrounding danger of shellfire and Chinese patrols. "I'm staying," Keenan barked resolutely. "I got a job to do and I'm going to do it!"

Unable to convince their friend, Caton and Holl were at least able to flush HM3 Keenan's eyes with water from their canteens. The two then continued on with their assignment, leaving Keenan to bandage his patients. When they passed the spot half an hour later as a rear guard for the American withdrawal, the Marines did not see their friend. Unknown to Caton and Holl, some time between 0230 and 0530 on 27 Mar 1953, shrapnel struck HM3 Joe Keenan in the head and killed him.

Dan Holl, Floyd Caton, and Joe Keenan had made a pact to write to each other's families should anything happen to one of them. The Marines had seen Keenan's wounds from the early part of the evening battle and knew that he would survive them, so the two wrote to the Keenan family to reassure them that Joe would be all right. These letters arrived at the Keenan's Massachusetts home shortly after the telegram announcing Joe's death. Holding out hope because of the conflicting information, the family contacted government officials to discover whether there had been a mistake—that Joe was still alive. Sadly, HM3 Joe Keenan's death was confirmed in correspondence from their senator, John F. Kennedy.

A Brother's Quest

Michael P. Keenan was 13 years old when his brother Joe was killed in Korea. The event left an indelible mark on him. Three decades later, when he obtained Joe's 1953 letters home, Mike Keenan began to try to

discover more about his brother's death. As he found Marines and Sailors who knew Joe, he discovered that his brother had been nominated for a decoration for heroism on the night he died.

Over the next 15 years, Mike Keenan continued to seek survivors of the battle that killed his brother. From each contact, Mike found others who verified Joe's heroic actions, including Holl and Caton, the Marines who had written to his family in 1953. Convinced of his brother's heroism, Mike assembled the supporting accounts and forwarded them to various military offices, hoping to spark some action to recognize Joe officially. Without the original award nomination, Mike was told, no action could be taken.

The original nomination, of course, had been lost in 1953. With the staggering casualties and normal transfers within Keenan's unit, the battalion became a completely new organization within a mere 2 months. If higher echelons of command had requested corroboration of the acts, no one left in the unit could verify them. It is easy to see how the nomination could have remained unprocessed. Fortunately, the issue did not end there. Through efforts undertaken at the Bureau of Medicine and Surgery, a successful award nomination negotiated Navy channels.

The award of HM3 Joe Keenan's Navy Cross has finally validated his heroism, his determination, and devotion to mission and friends. Perhaps more importantly, it provided emotional closure to his family and to the Marines and Sailors who survived that terrible night. □

HMCS(FMF) Hacala is Director of the Education Institute, U.S. Navy Memorial Foundation, Washington, DC. He is also the Command Senior Chief of Naval Reserve BUMED 106.

Story Behind the Story

One copy of Michael Keenan's document package concerning his late brother's heroism came to the historian's office at the Navy Bureau of Medicine and Surgery. Assistant Historian Dr. David Klubes made an initial search in the BUMED Archives, but his effort got a boost when he discovered a group of Hospital Corps personnel data cards that had been removed from the files. All these cards referenced hospital corpsmen who had received the Medal of Honor except for one. That card was HM3 Joe Keenan's.

Dr. Klubes shared his find with HMCS(FMF) Mark Hacala, a naval reservist who returned to active duty to research the history of the Hospital Corps for its 1998 centennial anniversary.

Intrigued, the two approached the Navy Awards and Special Projects office and asked if procedures allowed for resubmission of an award recommendation if their research verified Keenan's heroism. The answer was positive.

Later that day, HMCS(FMF) Hacala discovered a Korean War reunion group staying in the same hotel he was. As fate would have it, these men were veterans of Company F, 2nd Battalion, 5th Marines, Joe Keenan's unit! These were the very same men whose letters were contained in Mike Keenan's package.

Dr. Klubes and HMCS(FMF) Hacala began a 6-month investigation into the final day of Joe Keenan's life. They obtained unit rosters, battle reports, photographs, maps, and published material. They interviewed survivors of the terrible battle at Combat Outpost Reno and pieced together the clearest account of the events of 26-27 Mar 1953.

What resulted was a document of over 100 pages nominating HM3 Joseph F. Keenan for the Navy Cross. Upon recommendation of the Navy Awards Board, the Secretary of the Navy approved the posthumous award of the Navy Cross to HM3 Joseph F. Keenan.

Sailors' Valor in Battle

That first night of the Nevada Cities battles, between 6 and 10 hospital corpsmen accompanied their Marines into the fight. The Sailors who played a part in that battle distinguished themselves by heroic conduct under trying circumstances.

HN Francis Hammond was wounded as he moved about the battlefield for several hours, organizing the care and treatment of numerous casualties. Killed in action, he was posthumously awarded the Medal of Honor for his valor. Francis Hammond High School in his native Alexandria, VA, was named in his honor.

HN Paul Polley cared for his wounded although temporarily blinded and struck by shrapnel in the chest. He received the Navy Cross for his heroism. He retired from the Navy as a master chief hospital corpsman.

HN Thomas Waddill was on Reno when the Chinese attack began. He was captured after being dug out of the collapsed bunker and remained a POW for several months. He received the Navy Cross for his heroism in action.

HM3 William G. Jones moved to treat Joe Keenan, the other hospital corpsman in his platoon, when he was first wounded. When Jones tried to reach a nearby casualty, enemy shellfire killed him.

HM3 Jay Guiver accompanied a provisional platoon to evacuate wounded from Reno Block. Killed in action, he was posthumously awarded the Silver Star Medal for his bravery.

HM3 Jack Linn was severely wounded on the night of 26-27 Mar 53.

In the ensuing days of battle to retake nearby Outpost Vegas, several hospital corpsmen demonstrated similar valor and were also decorated.

HM3 William Charette: Medal of Honor

HN James McVeen: Navy Cross

HM3 Henry Minter: Silver Star Medal

HM3 Eldon Ralson: Silver Star Medal

HN Sidney Hughes: Bronze Star Medal

HM3 Donald Lee: Bronze Star Medal

HN Edward Schoonover: Bronze Star Medal

What Can Medical Do When Casualties Are Interspersed With Enemy, and Infantry Units Must Keep Moving?

Neil Carey, M.S., Ph.D.
Flora Tsui, Ph.D.

The extreme speeds, distances, and operational tempo assumed by Operational Maneuver from the Sea (OMFTS) have many implications for Navy medical support to the Marines. Casualties could be over 100 nautical miles from the nearest fixed medical facility or amphibious ship with surgical capacity, and the enemy might lie between the wounded and any treatment facility. The speeds and operational tempo will make it more difficult for helicopters to locate Marine Corps casualties, will complicate casualty evacuation, lengthen casualty wait times, demand more mobility from medical support, and require infantrymen or hospital corpsmen to provide more extensive treatment.(1-6)

Navy medicine has developed initial concepts of casualty care to sup-

port OMFTS.(2) These concepts include the use of better-trained personnel and more technology at the site of initial wounding, far forward surgery, more en route care during casualty evacuation, and a greater emphasis on prevention. These concepts are fueling consideration of important initiatives such as modular fleet hospitals, subsets called Navy Expeditionary Medical Support Systems (NEMSS),(7) and Aztec, an easy-to-deploy surgical shelter. Vanguard '98 is a recent wargame considering other biomedical technologies to support casualty evacuation under OMFTS.

These concepts could be refined by use of further quantitative analyses. Therefore, the Deputy for Marine Corps Medical Matters, N-093M, sponsored the Center for Naval Analyses project *Implications of Opera-*

tional Maneuver for Naval Expeditionary Health Services Support.(1) This project was undertaken to analyze the viability and resource implications of some of these concepts. This article summarizes the method and findings of the study.

In this study, we addressed the basic question, "How should we configure our medical assets in support of OMFTS?" Specifically, we were asked to use an OMFTS scenario developed by an earlier Center for Naval Analyses study called Project Culebra.(8) We were asked to look at time to treatment from the point of initial injury until the casualty finishes treatment aboard an amphibious ship.

We selected three basic alternative medical configurations: *Basic OMFTS*, *Leapfrog*, and *Forward*



New concepts of maneuver will often produce extreme distances from casualties and traditional ship-board surgical care.

Surgery. The ideal *Basic OMFTS* configuration would eliminate the logistics footprint by sea-basing all combat service support. Sea-basing combat service support would have the operational advantage of removing a high-payoff target for the enemy. We based our analyses of *Basic OMFTS* on the Culebra scenario, as described in reference eight. In this baseline case, there would be no surgical company or medical battalion ashore. All casualty evacuation would be via "lift of opportunity," i.e., using available helicopters that are already running nonmedevac missions to areas from which casualties need to be evacuated. In practice, when helicopters are available they can be given medevac assignments as needed. Advanced trauma life support (ATLS) functions would be performed by hos-

pital corpsmen assigned to organic units and their corresponding battalion surgeons assigned to organic units. In the past, ATLS has been called echelon 1B treatment.

In *Leapfrog* (LF), there is no ATLS treatment provided at the collection points; instead, casualties are immediately put on helicopters to be evacuated. This is very similar to what was often done in Vietnam, where we controlled the air, and casualties were often able to get to a hospital within an hour.^(9,10) A *Leapfrog* procedure was also used in Korea.⁽¹¹⁾ ATLS is then performed on the amphib, after which the casualty is immediately given resuscitative surgical care. The advantage of *Leapfrog* is that there is a shorter time for the casualty to be on the ground undergoing medical treatment. The casualty arrives in the safety

of the amphib earlier, with a shorter period awaiting evacuation from shore. However, initial ATLS is postponed on the *Leapfrog* configuration.

Forward Surgery would put the ability to do surgery at the collection point. The first surgical patients get the fastest time to surgery in the *Forward Surgery* option. However, *Forward Surgery* could limit operational flexibility, running counter to the basic premises of OMFTS. In all these three options, we can use designated medevac, which would assign helicopters the specific mission of medevac. The version of designated medevac that we used had a helicopter at each collection point, ready to immediately take patients to the amphib. This saves the time required for a helicopter to fly from an amphib to the collection point.

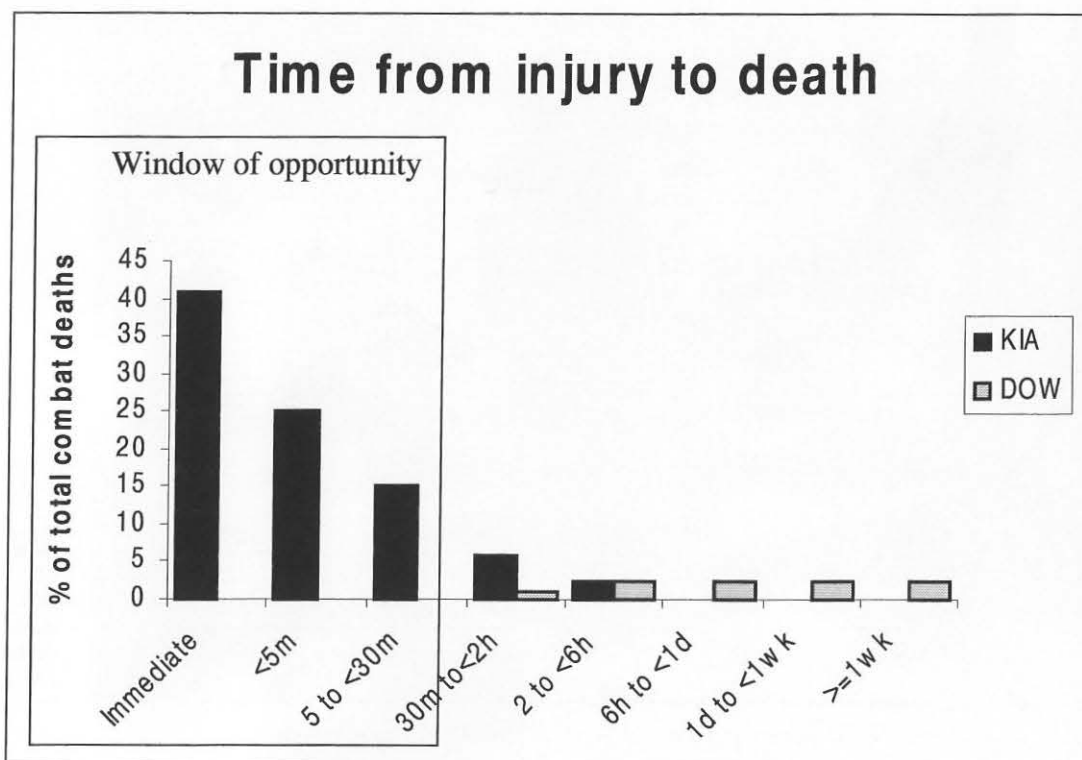


Figure 1. Bellamy's work indicates that the first 30 minutes is the critical period when most casualties die.

Our approach for this study was to have fixed resources so that we could model the resource implications of each alternative configuration. Our primary measures of effectiveness were time to treatment for high-priority patients (priority 1-2). Secondly, we wanted to determine whether there were sufficient helicopter sorties available to perform medevac ("stress on sorties"), and whether there were enough beds of different types on the amphibious ships.

Using queuing theory, we calculated expected average times to treatment for two different levels of treatment: ATLS and initial resuscitative surgery. This method provides results relatively quickly, allowing us to model a wider range of alternatives than we could have had we used alternative methods.

Medical professionals are the best judges of what level of treatment should be used as the most important criterion for time to treatment. Bellamy's analyses of Vietnam wound data⁽⁹⁾ suggest that the first 30 minutes after injury are crucial; over 70 percent of those who die will do so within that time (Figure 1). Very few of those casualties who survive 2 hours after injury subsequently die. From the look of the data, we believe that a standard of 60 minutes, "the golden hour," is reasonable, although 30 minutes would be even better.

Summary of Findings

Table 1 provides an overview of all our major findings. The *Basic* and *Forward Surgery* configurations are the best alternatives for minimizing the average time to ATLS (1.7 hours, vs. 4.0 hours for *Leapfrog*). The total

time to first surgery tells a slightly different story. The *Forward Surgery* option minimizes time to surgery in battles where there are only a few casualties, but for extremely large numbers of casualties, as we had on D-day, the *Basic* and *Leapfrog* configurations performed slightly better because patients got backed up waiting in queue for forward surgical facilities. We found that none of the configurations meet the criterion of "the golden hour." This finding underlines the importance of current initiatives to improve the medical training and supplies available to first responders (hospital corpsmen and infantrymen). The overall wait times we computed indicate that there would be many deaths under all three configurations.

Forward Surgery is for procedures that will save lives, save limbs,

Table 1. Summary of Findings

Overall comparison of configurations Priority 1-2 Patients--D-day

MOE	Basic	Forward Surgery	Leapfrog
Ave. time to ATLS (hrs)	1.7	1.7	4.0
Ave. time to 1 st surgery (hrs)	6.2	6.7	4.2
Personnel	Under-utilized	Over-utilized ¹	Under-utilized
Bed capacity	ICU/RR choke point	ICU/RR choke point	ICU/RR choke point
Sorties	No effect	No effect	No effect

¹Forward surgery providers are overutilized if only personnel from amphibious ships are used to perform forward surgery. Adding medical battalion personnel would correct this.

or significantly improve the quality of life. The Army sees the forward surgical teams (FST) as intermediate between an echelon two facility and an echelon three facility, so the procedures are pretty lengthy, most in the range of 6 to 7 hours.

The first casualty who needs surgical treatment is obviously better off (i.e., gets surgery sooner) if he has *Forward Surgery* because he doesn't wait for transportation to take him to the amphib. But it was an open question whether *Forward Surgery* would be faster for all patients, on average. In fact, when the number of casualties was large, *Forward Surgery* took longer, on average.

Forward Surgery decreases the number of providers on the amphib; we figured the number of treatment teams would decrease from eight to six, on average. (We held the number

of providers constant to provide a more meaningful comparison of configurations.) Taking personnel from the amphib to make forward surgical teams is a gamble: it involves guessing where surgery will be needed. If it turns out that surgeries are not needed there, you have wasted and endangered a very valuable asset. In contrast, a larger, more centralized platform, such as an amphib, can concentrate resources with less likelihood of severe misallocation. Specialty substitutions (e.g., an anesthesiologist for a nurse anesthetist) are also more easily accomplished in a centralized facility.

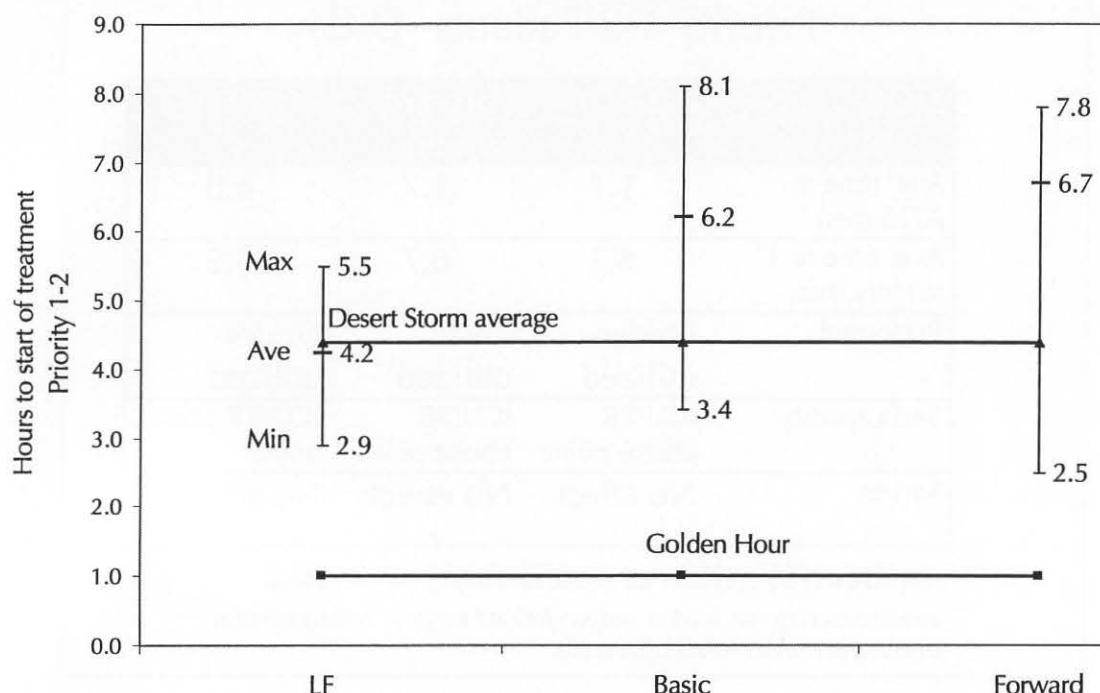
Furthermore, any queues for surgery at a forward surgical facility would be waiting for a very limited number of surgery table spots. The longer and more complicated the surgeries, the more this disadvantage

comes to the fore: you are holding up procedures for some people because others with long surgeries got there earlier. Figure 2 shows our findings on D-day. The Desert Storm average is from Leedham and Blood.⁽¹²⁾

Forward Surgery is superior, but only if three big "ifs" are met: if there are few casualties, if the *Forward Surgery* queue keeps only those casualties that require *Forward Surgery*, and if *Forward Surgery* is tactically possible. There are many situations where one or more of these criteria will not be met.

In *Leapfrog*, ATLS would be performed at the amphibious ship once the casualty has been evacuated. Redundancies between ATLS and resuscitative surgical tasks were eliminated. Surprisingly, there is enough redundancy between resuscitative surgery and ATLS that only about 7

Average time to first surgical capability, D-Day



Note: Figures refer to site average times, not individual casualties. Some patients will begin surgery in less than 2.5 hours, but the fastest site average was 2.5 hours in the *Forward Surgery* configuration.

Figure 2. *Forward Surgery* is the fastest configuration for time to resuscitative surgery initially, but long waits develop as casualties mount.

minutes, on average, were added to the echelon two treatment times aboard the amphib. This suggests that if time to resuscitative surgery is the most important criterion, *Leapfrog* is a good alternative.

As showed in Table 1, however, *Leapfrog* results in slower times to ATLS than does the *Basic OMFTS* configuration. Choke points and resource constraints remain. Our computations for all three configurations indicate that surface transportation will be tight. On the amphibious ships under times of high casualty loads, there will be a shortage of ICU beds, psychiatric personnel, lab techs, and X-ray techs.

For all three configurations, we

found a shortage of ICU/RR beds in theater. The problem is not with total beds available, but with the special beds needed for intensive care and recovery room care. Figure 3 shows the number of intensive care/recovery room (ICU/RR) beds needed requiring some time in ICU/RR for each 24-hour period. It demonstrates that we run out of ICU/RR beds by the second day.

One other thing we should mention is that X-ray techs and sometimes lab techs are necessary to make an Army-style FST work properly. We determined that the amphibians couldn't spare these specialists. This is a case where experimentation with digital radiography might improve the viability of the

option. We suspect that traditional chemically developed X-ray and lab facilities are not viable options in a forward-deployed status.

All three configurations had sufficient sorties available to implement medevac plans. This last finding does not suggest that OMFTS is easy to implement. The times to treatment are substantial, even without considering "fog of war" variables, such as difficulty finding casualties, or tactical situations that preclude getting casualties to safety in an efficient manner. We conclude that if we knew ahead of time that there would be a very small number of surgical cases, *Forward Surgery* would be an attractive option.

Depmed Bed Days: Available vs. Required

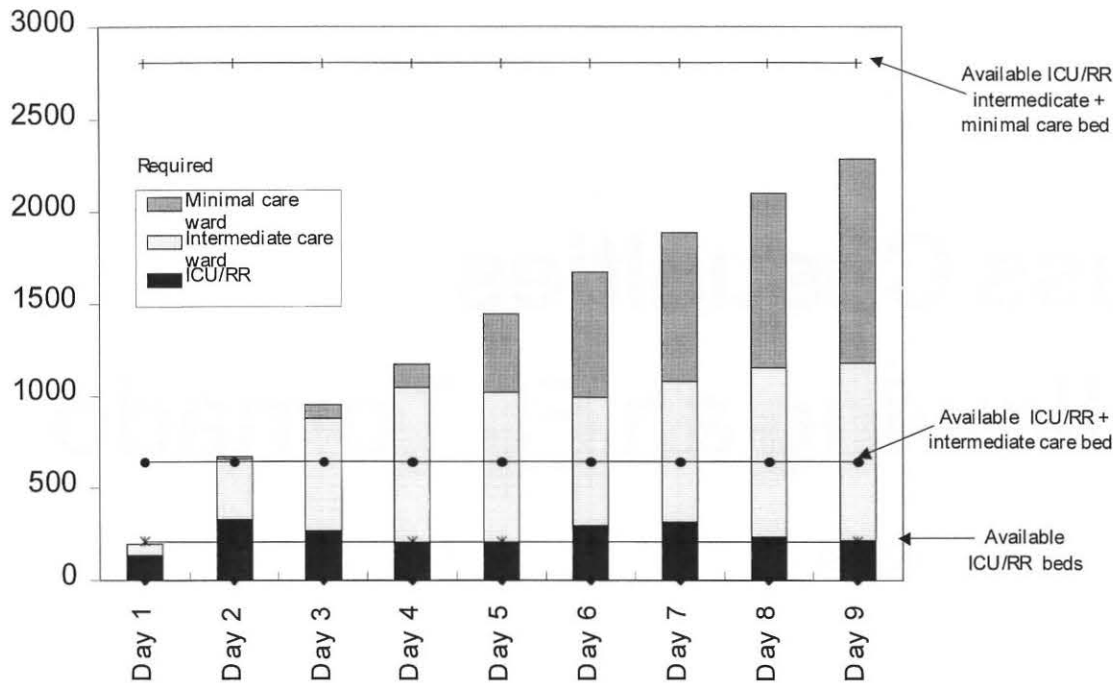


Figure 3. ICU beds aboard amphibians will be a choke point in a mass casualty situation.

In contrast, if we suspect that there will be a large number of cases, if we aren't sure of how long the surgical team's position can be protected from the enemy, or if the transportation time to amphib is short, FST is an unattractive option. Under these circumstances, *Basic OMFTS* seems the best alternative as long as you are confident in your medical personnel stationed at collection points, and you are sure that collection points can be protected adequately. If not, then *Leapfrog* would be the best option. *Leapfrog*, however, puts the most pressure on buddy care or organic corpsmen, because treatment at a medical facility is postponed for the longest period of time. Field experiments are the only way to determine the true viability of any of these options.

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Mass Casualties Following an F5 Tornado

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This article is written for two reasons. One is to remind all of us in Navy medicine that we sometimes may be called upon to practice our medical skills when we least expect it. The other, as catharsis, by putting to paper the physically, mentally, and emotionally challenging events that happened to me on 3 May 1999. That was the day multiple tornadoes ripped through the central portion of Oklahoma. One tornado (rated as the most powerful F5) carved a path of destruction 70 miles long, including 19 miles of suburban Oklahoma City. At times, this tornado was a half-mile wide with winds as high as 320 mph. At its maximum intensity, it left little standing in its path. Thousands of homes were destroyed. Trees and shrubs were uprooted and blown away. Grass was pulled from the ground. In some places, the storm even ripped away the street pavement.

In neighborhoods hit hardest, the destruction resembled the aftermath of a nuclear bomb. The only way people in the direct path of this monster could avoid death or injury was to be underground in a storm shelter. The death toll in the Oklahoma City tornado is now in the mid-40's and there were many hundreds injured. After viewing the

destruction, I am amazed the casualties were not much higher.

I was in Oklahoma City on emergency leave for my father-in-law's funeral. After a long day of making arrangements, my family and I had returned to my mother-in-law's to have dinner. We turned on the TV to catch the evening news and learned there was a major storm system and several associated tornadoes headed directly for us. We subsequently watched the late afternoon sky turn black, began getting golf-ball-sized hail, and heard the tornado sirens wailing all around us. We headed for the tornado shelter. We were fortunate. The tornado had missed us but we learned later that the path of devastation from this F5 storm was less than 4 miles from our location.

As everyone in the neighborhood walked from their homes and storm shelters to see the sunny skies returning, my in-laws' elderly neighbor approached us. He was visibly shaken and tremulous when he told us he had just received word that his daughter and granddaughter had been seriously injured and had been taken to the local hospital. He was in no condition to drive, so my wife and I offered to take him to find his family. At the time, I had no idea what I would find at the hospital.

When we got there, the casualties had just begun to arrive. It was quickly obvious that the ER staff was overwhelmed by the number of patients and the severity of their injuries. People were arriving at the ER via cars and pickup trucks. This was significant because there had been little or nothing done in terms of primary assessment and stabilization by well-meaning family and friends. Most of the patients were only partially clothed in what remained of their ripped and tattered clothing. Several of the injured were brought in on doors that were being used as stretchers. I don't believe I have ever seen so much dirt and mud mixed with blood.

Leaving my wife to help our elderly neighbor, I pulled my military ID, medical license, and specialty society cards from my billfold to present them to the nurse standing guard at the entrance to the ER. I need not have bothered with the identification. As soon as she heard I was a Navy physician, she literally grabbed my arm and showed me where to gown and scrub. In less than 5 minutes, I was seeing my first patient. Despite the fact that there had been brief introductions, in the mass confusion that followed, I was usually referred to as "Navy Doc." I heard a lot of, "Navy Doc, can you help me here?" or "Navy Doc, can you take the next patient?"

There were some very serious casualties. Among the many we received, there are a few I don't believe I'll ever forget. For instance, we resuscitated and stabilized a woman with a splintered 2 by 4 in her side. I learned later that she lived. Not everyone was so lucky. Among the casualties was the bruised and battered body of a young girl about five with multiple bent and broken limbs. She had the appearance of a dirty rag doll that someone had thrown down.

When the recalled staff began to arrive, I was moved to the secondary triage area in the cafeteria. Here I reassessed patients and started more definitive treatment. I ordered lots of X-rays and lab, and sutured wounds. Although the triage, resuscitation, and stabilization in the ER worked just as I had expected, I thought the crowd control in the cafeteria was a problem. Interestingly, the

secondary triage and holding area for all our mass-casualty drills when I served as the senior medical officer on the USS *Theodore Roosevelt* (CVN-71) had also been on the mess decks. But with real casualties and lots of understandably concerned family and friends all over the place, this was different.

Patients were lying side by side on rows of cots with their family and friends surrounding them. When we asked these folks to wait outside, more would filter in and take their place. As we were still seeing patients with potentially serious trauma, I found it awkward to disrobe them and do a more complete exam as a part of the secondary assessment. Since the ER was still packed with more serious casualties, it would have been better to have a secured intermediate area with some degree of privacy. Following a more complete assessment, stable patients could then have joined their concerned family and friends in an area such as the cafeteria.

Another thing I will never forget is the unique skin trauma many of these patients suffered. Skin exposed to the extreme force of the wind appeared red, rough and swollen. It often had the appearance and feel of a maculopapular rash. With gentle exploration of the papules, you would find small pieces of glass, dirt, and grass. Most amazingly, I would sometimes find what looked like a large whisker protruding perpendicular to the skin's surface. These were actually small pieces of straw or grass that were imbedded like a spear up to the depth of one centimeter. That night, I learned what a tornado can do to our fragile bodies.

When it became clear that we were no longer receiving casualties in the ER and the hospital staff could manage, I turned over my remaining patients and walked home. As we were saying our good-byes, I have never been more proud to hear "Thanks for everything, Navy Doc!" □

Dr. Fraser is currently serving as the Naval Safety Center Surgeon at the Naval Safety Center, Norfolk, VA.

Unplanned Pregnancy in Active Duty Women: The Rate and Associated Factors

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Unplanned pregnancies are a health concern for women and a major problem in the United States. The consequences of any pregnancy can be serious; morbidity and mortality in women of childbearing years increases during pregnancy. Unplanned pregnancies affect not only the individual woman and her family but also lead to high costs for society. In 1985 an estimated \$16.6 billion in public funds were spent to support teenagers with children.⁽¹⁾ Of the 6.4 million pregnancies that occurred in 1988, 56.5 percent were unplanned pregnancies.⁽²⁾ Current pregnancy prevention programs and readily available contraceptives have not been able to solve this problem.⁽³⁻⁵⁾

A major objective for national health care by the year 2000 is to reduce the incidence of unplanned pregnancy to no more than 30 percent.⁽⁶⁾ In the military, this issue is gaining more attention due to an increase in female personnel. In 1995 nearly 200,000 women were on active duty in the Armed Forces comprising approximately 14 percent of the total force.⁽⁷⁾ Recruiting projections envision this percentage climbing as high as 20 percent in the near future.

Most women on active duty in the military are in an age group considered either the "childbearing years" or "at risk for unintended pregnancy." Those who are single and at the low end of the socioeconomic scale continue to account for the majority of unplanned pregnancies.⁽⁸⁾ As more women enlist, this societal trend will be reflected by increased rates of unplanned pregnancies in young women, possibly affecting military readiness.

Pregnancy is a positively anticipated occurrence in growth and development within the context of a family life. This normal developmental or maturational crisis can be

managed effectively within the parameters of military life if the pregnancy profile is uneventful. The ability of active duty women to mobilize is not negatively affected by a pregnancy per se, but more so by an "unplanned" pregnancy, which can intensify the crisis perspective of pregnancy for these women. An increase in the number of pregnancies reported as unplanned by active duty women is of significant proportions to warrant empirical investigation.

Problem Statement

Many active duty women who deliver babies at the data collection site for this study are unmarried. Many are in their late teens to early 20's, single, and completing an unplanned pregnancy. Despite the common acceptance and ease of access to birth control products within society at large and the military in particular, the number of single parents in the military has increased in recent years, resulting in concerns of military leaders for effective readiness and mobilization.⁽⁸⁻⁹⁾

The unplanned pregnancy is one critical issue. It is anticipated that findings from this study will provide a knowledge base for unplanned pregnancy occurrence and associated sociodemographic factors among active duty women, and aid in developing appropriate interventions for decreasing the unplanned pregnancy rate evident for military personnel. Decreases in unplanned pregnancy can positively affect sailors' lives, save taxpayer dollars, and ultimately increase readiness for mobilization.

Literature Review

Approximately two-thirds of women (40 million) of reproductive age (13-44 years) in the United States meet

the criteria (sexually active, not pregnant, fertile, and not trying to conceive) for being at risk for unplanned pregnancy. The level of contraceptive use in the United States among these women has grown to nearly 90 percent. Despite this high level of contraceptive use, unintended pregnancy remains a substantial problem. Of the 6.4 million pregnancies that occurred in the United States in 1988, more than half (56 percent) were unplanned. An equal number of unplanned pregnancies end in abortion (44 percent) as with birth (43 percent), and both options have great personal and social consequence.(2)

Sociodemographic risk factors that have been explored relating to unintended pregnancies include maternal age, marital status, race, income, parity, and education. Independently or in combination with one or more of the other sociodemographic risk factors, maternal age, marital status, and income have been found to be predictors for unplanned pregnancies.

Age, Race, Marital Status, Education, and Income

Although the level of unplanned childbearing was high in almost all socioeconomic subgroups of women, the proportion of births that were mistimed or unwanted was 50 percent or greater among age groups 15-24 years, and among never married women (73 percent), black women (66 percent), women living below the poverty level (64 percent), women with fewer than 12 years of education (58 percent), and women who already had 2 children (53 percent) or 3 or more children (60 percent).(10) Some socioeconomic subgroups of women who tend to have poor pregnancy outcomes—those who are unmarried, young, and poor or low-income—have disproportionately higher levels of unplanned childbearing.(2,11,12)

Unplanned Pregnancy in Active Duty Women

The unplanned pregnancy occurrence among active duty military is similar to the civilian counterparts. In 1985 36 percent of the active duty soldiers delivering babies at a large southwestern Army installation were single. Many of those soldiers were unmarried adolescents completing an unplanned pregnancy.(8) When the Marine Corps women (mean age +20.2) were surveyed in 1986, it was noted that 18 percent had been pregnant; 60 percent of these pregnancies were unplanned, and 64 percent were terminated by abortion.(13)

In 1988 it was reported that 91 percent of the pregnancies among unmarried active duty sailors were unplanned, and 17 percent were terminated by abortion. Of those who carried to term, only one-quarter became married before the birth.(14)

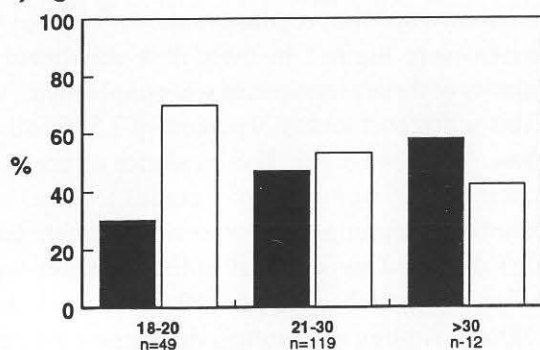
In 1989 point-in-time self-report data from the Navy have shown that the pregnancy rates among Navy enlisted women were highest in their first enlistment, and the majority of these pregnancies were unplanned. At the time of this self-report survey, 9 percent of 2,515 enlisted Navy women were pregnant. The incidence of pregnancy was greater among women in pay grades E-4 and below (68 percent) and among those who were unmarried (86 percent). About 64 percent of all enlisted women were in pay grades E-4 and below, and 10 percent of them were pregnant. Among age groups, the highest pregnancy rate were among the 20 to 24 years old (34 percent), followed by those who were 25 to 29 (28 percent). Women under age 25 accounted for almost 2/3 of pregnancies. Like their civilian counterparts, more than half of these young service women reported that the pregnancy was unplanned (60 percent).(9)

Women in military service who become pregnant experience conflict between their work and parental roles. As a consequence, some leave the service.(15) Historically, active duty women were involuntarily separated from the military if they became pregnant. In 1975 the Department of Defense issued a directive to all military services instituting the policy to provide a woman who becomes pregnant the choice of remaining in the service or being given an honorable discharge.

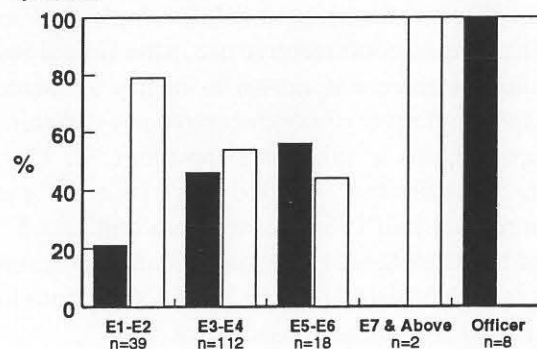
Today military women who want to remain in the service while pregnant may do so. However, if they determine that their pregnancy and/or resulting demands of childbearing render them unable to perform their military duties, they may request a discharge.(8,9,13) Consequently, the military suffers the monetary loss spent in the training of those service women and unknown numbers of hours of anticipated service. However, those who remain on active duty experience problems affected by pregnancy and subsequent child rearing. Many of these women are young, single, and completing an unplanned pregnancy.

The active duty service woman is an employed person and a single new parent, and whereby all single, employed new mothers encounter problems that are unique to their situation, those problems become intensified when the pregnancy is unplanned. Working single mothers must cope with specific, stress-producing needs to maintain competence in performing their jobs. Successful performance in the roles of mother and of soldier is further compromised by factors such as the associated stress of absence from the child for long hours and lack of support in the work environment, especially for those women needing frequent work release time due to a child's illness or other child-related commitments.(8,16) Thus, unmar-

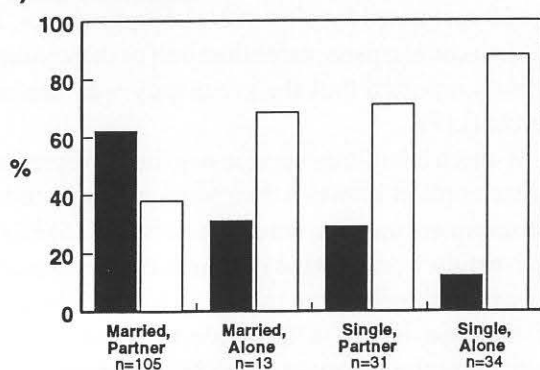
a) Age



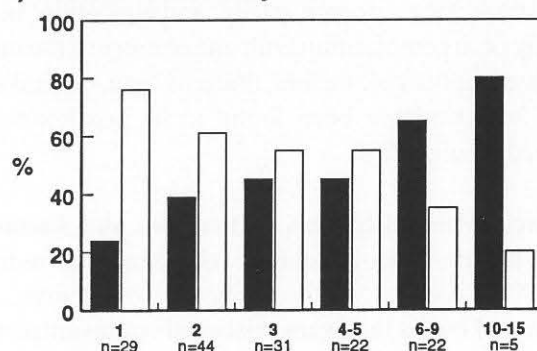
e) Rank



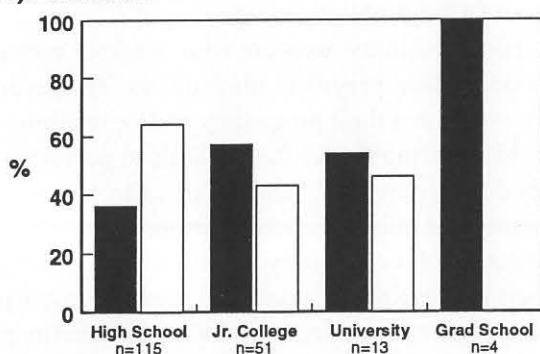
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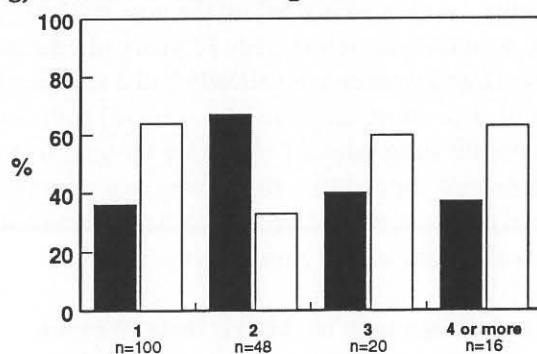
f) Years of Active Duty



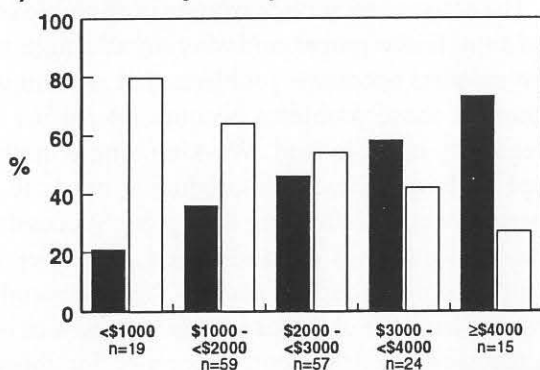
c) Education



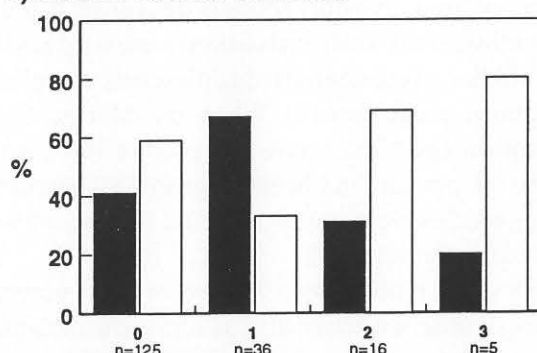
g) Number of Times Pregnant



d) Total Monthly Family Income



h) Number of Prior Deliveries



■ Planned □ Unplanned

ried women with unplanned pregnancy and subsequent child rearing become a concern for the Navy because of the difficulties they encounter when attempting to fulfill military and parental responsibilities simultaneously. This is often compounded by their lower socioeconomic status and lack of an adequate support system. Unplanned pregnancy becomes a readiness issue and cause for concern when women are excluded from mobilization availability.

Results and Discussion

Sociodemographic data for this study were collected from a previous prospective exploratory study of 219 active duty pregnant women who carried the pregnancy to term at a major military medical treatment facility on the West Coast and its four affiliated obstetrical clinics.⁽¹⁷⁾

Race and branch of service showed no evidence of being related to pregnancy planning. However, the other eight significant variables depicted in the figure did show the relative frequency of planned versus unplanned pregnancies. Unplanned pregnancy correlated negatively with age, marital status, income, years of active duty, and rank (except chief petty officer level). Unplanned pregnancy decreased, however, only with second pregnancy and after one delivery (gravity 2, parity 1). Results of these variables are explained in detail in the following section.

Unplanned Pregnancies by Age and Marital Status

Among age groups, the highest unplanned pregnancy rate for active duty women occurred in those 18 to 20 years old (70 percent). The unplanned pregnancy rate to unmarried women was 80 percent compared to married women of 42 percent. Unmarried women are, indeed, at highest risk of experiencing unplanned pregnancies. Military's concern over single parents stems from the conflicting demands such personnel experience. If they are in their first enlistment, the financial strain of living offbase, paying for child care, and assuming the other costs associated with children is excessive. Moreover, single parents are considered to be less flexible in their hours and assignments. To avoid these consequences, the unplanned pregnancies of unmarried women need to be reduced in number or prevented if at all possible.

Unplanned Pregnancies by Education

Unplanned childbearing was high among women with only a high school education (64 percent) compared to women with more than 12 years of education. Women with at least some college background are less likely to have an

unwanted birth, perhaps because they are more career oriented, thus motivated to avoid unplanned pregnancy.

Unplanned Pregnancies by Income, Rank, and Years of Active Duty

The incidence of unplanned pregnancy in regard to income, rank, and years of active duty were highest among lower monthly income groups (<\$1,000), lower pay grades (E-1 to E-2), and in their first enlistment. Unplanned pregnancy decreased with higher pay grades, except at the chief petty officer level (E-7 and above). The unexpected result for chief petty officers could be due to their misconception about their fertile period, resulting in a contraceptive nonuse or ineffective contraceptive use, or these members could be unmarried, placing them among the group at highest risk of experiencing unplanned pregnancies. This is an assumption, since almost half of all marriages in the general population end in divorce.

The years of active duty had a negative correlation with the incidence of unplanned pregnancy. As years of active duty increase, unplanned pregnancy decreases, just as is true with age, rank, and income since they go hand in hand (see figure). During the first year of active duty, the unplanned pregnancy rate was 76 percent as compared to 20 percent among active duty women with 10-15 years of active duty. Perhaps the reason for this profound rate of unplanned pregnancy among women in their first year of active duty or first enlistment is that these young women are away from home, most for the first time, and lack the social support and guidance that close friends and relatives can provide. They are also at a very fertile period in their lives and would be expected to have a high pregnancy rate.

Unplanned Pregnancies by Number of Pregnancies and Number of Deliveries

Similar to other previous studies, number of pregnancies and number of deliveries were significant determinants of pregnancy planning.⁽¹⁵⁾ The unplanned pregnancy was highest among women experiencing their first pregnancy (68 percent). For the number of deliveries, the unplanned pregnancy was high among women with no prior deliveries (59 percent), but highest among those who already had two children (69 percent) or three children (80 percent). Although in this study the percentage is lower among women with no prior deliveries, they account for 74 women compared to 1 woman with 2 children and 4 women with 3 children. The result indicates the highest incidence of unplanned pregnancy among active duty women experiencing their first pregnancy and with no prior deliveries.

Summary

Active duty women whose pregnancies were unplanned were significantly younger than women whose pregnancies were planned; they were predominantly unmarried, with lower income, in lower pay grades, in their first enlistment, and in their first pregnancy. Variables such as age, rank, income, and years of active duty were expected to be correlated: as one increased, the others were more likely to be greater. These variables were also expected to be correlated with the incidence of unplanned pregnancy, but in a negative manner: as its variables increased, the incidence of unplanned pregnancy would decrease.

The strongest predictor of pregnancy planning (unplanned vs planned), independent of each other, was the marital status variable: $p < 0.001$. The second strongest was rank: $p = 0.016$, while the third strongest was the number of deliveries: $p = 0.083$. Now that the rate and associated risk factors among active duty women have been identified, appropriate interventions should be developed to help in decreasing the incidence of such pregnancies.

Conclusions and Recommendations

Results of this study confirm data accumulated in both the civilian and military sectors. Women who are young, unmarried, poor, less educated, in their first enlistment, and those who already have children are most at risk of experiencing unplanned pregnancies. The difficulties these women have in controlling childbearing may be influenced by the level and specificity of their childbearing goals, by their practice of contraception including its effectiveness, and by the likelihood that they will have an abortion if they became pregnant. High levels of unplanned births indicate that such women and their partners need increased assistance in achieving their family size and birth timing goals.

Reasons for the increase in the unplanned pregnancy rate at a time when birth control is safe and readily available are complex. Among the causes of unplanned pregnancy might be the failure to use birth control methods or incorrect or inconsistent use of birth control.

A pilot study is currently under way to evaluate the interrelationships of STDs, contraceptive use, sexual behaviors, and other factors which influence negative reproductive health outcomes. The intent of this study is to develop and evaluate an intervention to prevent unplanned pregnancies and STDs. Components of this study include, but are not limited to, sexual responsibility, contraceptive methods, and relationship building.

In addition, intervention studies in nursing should be conducted, particularly those involving contraceptive counseling for active duty women who are at risk for unplanned

pregnancy. Classes, individual counseling with interval followups, brochures, and other media could be evaluated as possible nursing interventions. Developing and implementing a comprehensive birth control/family planning education program is vital in reducing the unplanned pregnancy rate among single active duty women. Also, involving partners, single active duty men in all aspects of interventions can enhance successful outcomes. A coordinated program to include a standardized block of instruction and an informational lecture during in-processing at each command would further educate and reinforce the initial teaching received through "wellness" classes provided in basic training at Great Lakes, IL.

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Foxy-29 and Tank Deck Hospitals

The Medical Role of LSTs in the Invasion of Normandy

Dale Groom, M.D.

Part III (Conclusion)

In the last issue the author described preparations for the invasion of Hitler's "Fortress Europe," the mounting tension as D-Day drew closer, the Channel crossing, and the ferocious bombardment of the invasion beaches. The greatest amphibious landing in history was about to begin.

H-hour, 0630 of 6 June 1944, had arrived at last. The assault was on and all craft in sight were heading in a precise order toward their assigned sectors of Omaha Beach. Legendary were the feats of two destroyers that closed the shoreline to blast vital targets, of LCT (landing craft tank) skippers who at great sacrifice, with decks awash, and under a hail of gunfire, turned their guns on enemy fortifications.

Landing on a hostile beach is not just a matter of charging the enemy with blazing guns and cold steel. It is a highly integrated operation involving concerted operations of many specialized units of troops, both Army and Navy.

Among the first to debark are the Rangers, or "commandos," who clamber over almost insurmountable obstacles, scale cliffs, and penetrate barbed wire, hidden traps, and enemy fire to attack machine gun nests, stealthily and often single-handedly. A hand grenade or two hurled from the rear into a "pill box" or machine gun nest might wipe out its gunners. There are the demolition units, engineers whose job it is to locate, mark, and render ineffective mines and other hidden explosives. Hydrographers wade in the surf to measure and mark landing areas. Beach control units land and direct traffic in and out. Antiair-

craft, salvage, and the ever-present medical personnel all perform their carefully choreographed roles. Only after the troops attain a foothold can the rest of the troops with tanks, trucks, bulldozers, and artillery come in for the big assault.

But at our sector of Omaha all did not go so simply as that. Some survivors of the initial attack told how they were greeted with a withering gunfire that seemed to come from all directions at once, how some of the units attempting to wade ashore just never made it, caught in underwater entanglements and drowned carrying their heavy packs.

When the fifth wave arrived to land on schedule they found bodies floating in the water instead of organized crews on the beach. Treacherous barricades and fire from shore batteries swamped many boats, kept others offshore, or riddled them with shrap-



Having unloaded its cargo off of Omaha Beach, LST-357 awaits the arrival of casualties.

nel. The Rhinos, carrying the bulk of our tanks, trucks, and mechanized equipment, were kept at bay the entire day, unable to approach closer than 100 yards due to heavy shelling. Artillery fire hit one LCI (landing craft infantry) turning it into such an inferno that more than 200 troops said to be inside perished before they could move. No, this was not a push-over.

Contrary to what some early reports would lead one to believe, the Germans offered sustained fierce opposition and exacted a bloody price. Success, it seemed, might well have gone to either side. It is a known fact that small arms fire continued on Omaha Beach for more than 2 days. But we took the beach and kept it. Certainly no war in history has had medical care in such abundance. On the Navy side, the heroic efforts of beach first-aid units plus the promise

of LST hospital care, and a less than 24-hour voyage back to England did much to bolster troop morale. One can be more fearless with the promise of such medical support behind him.

At Omaha, the chaos and heat of battle both on the beach and in the water was such that relatively few casualties could be brought out to LSTs. Later we heard that 3,000 dead and wounded lay on "bloody Omaha" beach by noontime. Of them, we received only a dozen or so that day, carried out in whatever small boats could be mustered and then hoisted aboard our ship by sling. As I recall, all had received at least the most urgent and obvious first aid. One boy was said to have saved his own life by applying constricting pressure to a leg shattered by shrapnel. This prevented fatal hemorrhage until he could be rescued by one of our hospital corpsmen ashore. Morphine syrettes could

make just about anything tolerable. Even some men with the most extensive injuries appeared to have vestiges of fight left in them and could even manage a smile when plied with good hot coffee. Nevertheless, they were dead earnest as they told how "that was one hot beach."

Having come in first, we were first to head back at dusk on 6 June. Even though we could not know how many dead and wounded we were leaving behind, there was a sense of relief for having had it out with the enemy at last. So far, at least, it would not be another Dunkirk retreat.

If that first trip was the proverbial "piece of cake," the second turned out to be a sobering, tragic catastrophe with heavy loss of life. Loaded anew, we left Weymouth harbor the evening of 8 June in a convoy of only four other LSTs escorted by a vintage British destroyer, HMS *Beagle*.

Shortly after midnight and just a few hours from our destination, two torpedoes plowed into the ship ahead, believed to be the LST-314. A German E-boat, painted black so as to be invisible in the dark of night, was said to have fired them. Immediately, a third explosion put that ship in flames. Men jumped from flaming decks into the icy waters, floundering and calling for help. Pleas to our captain to stop and rescue the helpless victims were unavailing. He refused, citing Navy regulations that prohibited such an action, lest rescuer too become a victim. And surely he was right, for moments later a second LST to our rear was ablaze.

One can never forget such a haunting scene indelibly impressed in memory and often relived. When tragedy strikes close friends there is an impact far beyond the identity of ships or the number of dead. Only later did I learn that some of our hospital corpsmen lost their lives that fateful night, as did my friend Dr. Landaal. He went down with his ship displaying all the heroism of nobility. But despite this tragedy, the mission of our three remaining LSTs was to forge ahead at 10 knots—on to Omaha. German forces by now were being reinforced and better organized. So were Allied land, sea, and air forces. At Utah, the other designated American beach to the west toward Cherbourg, and at Gold, Juno, and Sword beaches of Canadian and British forces to the east, lesser resistance and/or fortifications had made landings less eventful. It was at Omaha, in the middle, that casualties ran so high, especially those first several days.

By D+3, however, LSTs could be loaded faster and with greater facility because they could venture closer to the beach. There the LCTs proved their worth, bringing out the injured en masse, “marrying” their bow ramps to

those of the LSTs so stretcher cases could easily be carried directly from one to the other. My recollection is of 220 cases brought aboard that second trip, taxing to the maximum the 18 hospital corpsmen and myself. A dozen or so were German POWs.

Truthfully, nationality was not a criterion in decisions and management of our care. The fact that only one of all those patients died along the way, that trip is a tribute to everyone who worked tirelessly in our tank deck hospital, oblivious to the sounds of battle outside. There they administered appropriate medical and surgical measures to maintain life and to deliver our patient in the best possible condition to the lines of waiting ambulances at Weymouth harbor. After all, the motto displayed with the stork on the bulkhead of LST-357 was WE DELIVER. That we did, coming and going.

By the time of our remaining three trips, one to Utah beach, battlefronts had progressed far inland making it possible for LSTs to utilize the tides to land high and dry on the beaches, awaiting a subsequent high tide to refloat and pull back, a feat accomplished by reeling in the cable to its stern anchor buried out to sea. Beaching afforded a tremendous advantage both in delivering cargo and carrying stretchers aboard.

Also, by then, our engineers had constructed a runway above the cliffs at Omaha; we could see those C-47s, the military version of the good old DC-3s, landing and taking off. They not only could transport patients faster but also could deliver them directly to hospitals throughout the British Isles.

Left behind by an advancing battlefront, medical units established ashore were able, with more time and facilities and free of the urgencies of battle, to provide vastly more than emergency first aid, preparing patients more

adequately for transport. The pace of our trips slackened. Fewer injured were brought to us for our 15 or so trips back to England, none at all on the fifth and last trip.

On 25 June 1944 our unit was transferred off the 357 and headed back for duty in America. The mission of the LST fleet became confined to supplying the heavy equipment for armies advancing through Europe, ultimately into Germany itself, some making as many as 50 or more trips as the war dragged on for yet another year. Of those “tank deck hospitals,” let it be said that they served well their

Courtesy of author



The author examines a wounded POW German officer.

Dr. Groom with the helmet he wore on D-Day.

role of preserving life for thousands of casualties under circumstances unique to the invasion of Normandy. How many American lives were thus saved must remain a matter of conjecture. Far more certain is that FOXY-29 had written a little known but illustrious chapter in the annals of victory for the Allies in World War II.

Epilogue

Recently I visited the American Cemetery above the cliffs of Normandy where are buried 3,000 of our countrymen killed in the invasion. There at the head of that field of white crosses stands an impressive monument—a wall—bearing names of “Men of the American Navy Lost at Sea, Their Bodies Never Recovered.” Inscribed among them I recognized those of several of our hospital corpsmen, including the able chief who shall have my undying gratitude. I came away with a new appreciation of the privilege of having known and served with those men of FOXY-29, men who gave their lives helping others to survive.

Notes

William Bradford Huie was a well-known American writer who served as a correspondent and photographer in the Normandy Invasion. Among his novels is one, subsequently made into a movie, *The Americanization of Emily*. In that he gives a first hand, vivid description of the D-Day landings at Omaha Beach. Some of his



film footage shot there has been included among U.S. documentary coverage of the war.

German documents recently made public contend that Hitler, against the advice of his generals, believed the Allied drive toward the Normandy beaches was a feint, and that he withheld initially heavy reinforcements to await the *real* invasion, presumably to the east where the English Channel is much narrower. Only after it was clearly evident that Allied beachheads were secure and his fortifications breached did he order reinforcements and then too late to drive the Allies back into the sea. Six months later, during the final drive on Germany, were we to meet his defending troops at the famous Battle of the Bulge.

Recently I learned that there were indeed survivors of LST-314. Correspondence with its captain, Alvin Tutt, and executive officer, George Szabo, both said to be the last alive to leave the sinking ship, provide a vivid and an

official account of those last 20 or so minutes before she went down. To my inquiry about Dr. Landaal, who had officially been reported to have “died valiantly at his post,” his response was poignant: “I remember Dr. Henry Landaal well. He treated a scalp wound I got from the Salerno, Italy, invasion, found a piece of shrapnel in it and healed it in a few days. At the sinking of our 314 I observed him helping to load injured personnel onto the only remaining small boat we had. I told him to go with his life jacket on, and later I learned that he had instead put his senior corpsman in charge of the wounded as the boat was lowered away.

I never saw Dr. Landaal again, and can only assume that he died from exposure in the cold water.” The official Navy report that he “died valiantly at his post” was certainly an understatement, for he chose to give up his place in the boat to his injured shipmates.

In the executive officer’s report it is noted that the HMS *Beagle* returned to pick up the “approximately 53 percent of the Navy crewmen who survived” their 3-4 hours in the 50° F water, some clinging to rafts, plus bodies of the victims of hypothermia. Of the Army personnel aboard and lost there is no record.

Certainly, the heroism of my friend Henry Byron Landaal, M.D., whose body was later reported recovered and shipped back to his Wisconsin home for burial, was in the highest tradition of the U.S. Navy and of our profession of medicine. □

Dr. Groom resides in Jacksonville, FL.

In Memoriam

Zachary Fisher, New York developer and renowned philanthropist, died on 3 June 1999. (See *Navy Medicine*, January-February 1993.) "This is a great loss to the Department of Defense and to all of our men and women who serve around the world," said Secretary of Defense William S. Cohen of the Brooklyn-born Fisher. "Zach Fisher was a true patriot, who believed in a strong defense, and held American military servicemen and women in the highest regard. He honored us all with his pride in the U.S. military and his generous, heartfelt support of those who defend our nation."

When the United States entered World War II in 1941, Zachary Fisher was ineligible to serve in the armed forces due to a serious knee injury sustained in a construction accident. Nevertheless, determined to do his part, Fisher aided the Army Corps of Engineers in building coastal fortifications. Following the war Zachary Fisher and his brothers earned an international reputation as leaders in the construction industry, contributing some of the most prominent corporate office buildings to the New York City skyline.

But Mr. and Mrs. Fisher have been best known over the last 2 decades among the U.S. military for their work to support families in need. The Fishers, saddened by service-related tragedies that often cost the lives of military personnel and shatter families left behind, established the Zachary and Elizabeth M. Fisher Armed Service Foundation following the 1983 terrorist bombing of the U.S. Marine barracks in Beirut, Lebanon. This attack, which took 241 American lives, moved the Fishers to make generous financial contributions to support each of the families affected by this tragedy. To date, more than 250 families from all branches of the armed services have benefited from similar support.

The Fisher Armed Services Foundation also provides scholarship funds to armed services personnel and their families. Since 1987, more than 700 students have received scholarships of between \$500 and \$2,500, assisting in their education.

In 1990 the Fishers began the Fisher House program, dedicating more than \$15 million to the construction of temporary homes for military families of patients receiving care at major military and VA medical centers. The houses are designed to provide all the comforts of a "home away from home," and to allow the families to support one another through their difficult times. The 25th Fisher House opened in Fort Hood, TX, in May 1998.

In similar charitable efforts, the Fishers pledged \$1.4 million for the establishment of a child care center at Camp Pendleton CA, and led support for the camp program at Lackland Air Force Base, which services disabled children of military personnel.

Zachary Fisher also founded the Intrepid Museum Foundation in 1978, saving the historic and battle-scarred aircraft carrier *Intrepid* from scrapping. Through his efforts, the ship became the cornerstone of the Intrepid Sea-Air-Space Museum, which opened in New York City in 1982. He contributed more than \$25 million to the establishment and operation of the museum.

Mr. Fisher was also involved in many other patriotic and charitable causes. He was a major supporter of the Jewish Institute of National Security Affairs, the George C. Marshall Foundation, the Margaret Thatcher Foundation, the Reagan Presidential Library, the United Jewish Appeal, and many other organizations. Fisher was a recipient of the Horatio Alger Award and was presented with the Volunteer Action Award by President Reagan on 10 June 1988. In April 1995 President Clinton presented Mr. Fisher with the Presidential Citizens Medal and in 1998 the president awarded him the nation's highest civilian honor, the Presidential Medal of Freedom.

Secretary of the Navy Richard Danzig also recognized Fisher's tremendous support provided to Sailors and Marines. "It is impossible to measure the good that Zach Fisher has done for the Navy and Marine Corps," said Danzig. "His efforts to save the historic carrier *Intrepid* have received wide acclaim. But he will be best known and loved for the generous contributions that he made quietly—often out of the public eye, with no recognition—to hundreds of our servicemen and women and their families. We will miss him deeply.

"Chief of Naval Operations ADM Jay Johnson added, "It is with profound sadness that I note the passing of Zachary Fisher. He was a true friend of the United States Navy and a great benefactor to our Sailors and their families. We will miss his warm friendship, his deep compassion, and his wonderful vision in caring for the families who serve our great nation. No one person has done more to help military families than Zach Fisher. He was a true patriot who will always be remembered for his spirit of generosity. Our prayers are with Mrs. Fisher and the entire Fisher family."

—Excerpted from Navy News Service

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